**AMENDMENTS TO THE CLAIMS**:

Kindly amend claims 1, 22, 23, and 39, as follows:

**Listing of claims**:

1. (currently amended) An iterative carrier phase tracking decoding system comprising:

a buffer for buffering a block of symbols;

a serial turbo decoder for providing, during an iteration p, estimates $s_k^p$ of one or more of the buffered symbols, $r_k^p$, and~~, optionally,~~ having a capability to provide one or more reliability metrics $R_k^p$, for the one or more estimates, and, after a prescribed number of iterations, estimates of underlying source bits;

a tracking loop module configured, during an iteration p, to (a) determine one or more residuals $z_k^p$, between the one or more buffered symbols, $r_k^p$, and the corresponding one or more symbol estimates, $s_k^p$; (b) ~~optionally~~ weight the residuals with corresponding reliability metrics, $R_k^p$; and (c) determine one or more derotation phases $\theta_k^p$ responsive to one or more of the weighted or unweighted residuals;

a symbol derotator for derotating, during an iteration p, one or more of the buffered symbols, $r_k^p$, using the one or more derotation phases, $\theta_k^p$, and storing one or more of the derotated symbols, $t_k^p$, back in the buffer; and

a controller for directing the system to perform one or more iterations.

2. (original) The system of claim 1 further comprising a delay element for compensating at least in part for delay through the serial turbo decoder and the tracking loop module.

3. (original) The system of claim 1 wherein the serial turbo decoder comprises a series combination of a inner SISO, a de-interleaver, an output SISO, and an interleaver, wherein the inner SISO has an a priori input coupled to the output of the interleaver.

4. (original) The system of claim 3 wherein the inner and outer SISOs are soft output decoders.

5. (original) The system of claim 4 wherein the decoders are log-MAP decoders.

6. (original) The system of claim 3 wherein the symbol estimates are provided by the inner SISO of the serial turbo decoder.

7. (original) The system of claim 3 wherein the symbol estimates are derived from the output of the interleaver of the serial turbo decoder.

8. (original) The system of claim 7 wherein the symbol estimates are derived by passing the output of the interleaver through an encoder and channel symbol mapper that is configured to generate a code that the inner SISO is capable of decoding.

9. (original) The system of claim 1 wherein one or more of the buffered symbols $r_k^p$ are derotated only during selected iterations.

10. (original) The system of claim 1 wherein one or more of the buffered symbols $r_k^p$ are derotated after a prescribed number of iterations.

11. (original) The system of claim 1 wherein one or more of the buffered symbols $r_k^p$ are derotated only during an initial number of iterations.

12. (original) The system of claim 1 wherein the tracking loop module is configured to determine one or more of the derotation phases $\theta_i^p$ in accordance with the following equation:

$$\theta_i^{\,p} = \sum_{j=i-W/2}^{j=i+W/2} z_j^{\,p} \bullet w_j$$

where $\sum_{j=i-W/2}^{j=i+W/2} w_j = 1$, W is the size of a window, in terms of number of symbols; $z_j^p$is a residual derived from a comparison of a buffered symbol $r_j^p$ with a corresponding estimate of that symbol $s_j^p$; and $w_j$ is the weight assigned to the jth residual $z_j^p$.

13. (original) The system of claim 12 wherein the weights $w_j$ follow a time-domain description of a predefined phase-noise mask.

14. (original) The system of claim 1 wherein the tracking loop module is configured to determine one or more of the derotation phases $\theta_i^p$ in accordance with the following expression:

$$\theta_i^{\,p} = \frac{\sum_{j=i-W/2}^{j=i+W/2} z_j^{\,p} \bullet w_j \bullet R_j^{\,p}}{\sum_{j=i-W/2}^{j=i+W/2} w_j \bullet R_j^{\,p}}$$

where W is the size of a window, in terms of number of symbols; $z_j^p$ is a residual derived from a comparison of a buffered symbol $r_j^p$ with a corresponding estimate of the symbol $s_j^p$; $w_j$ is the weight assigned to the jth residual $z_j^p$; and $R_j^p$ is a reliability metric for a symbol estimate $s_j^p$.

15. (original) The system of claim 1 wherein the tracking loop module is configured to determine one or more derotation phases $\theta_k^p$ in accordance with the following equation:

$$\theta_k^{\,p} = \sum_{i=1}^{N} a_i \bullet \theta_{k-i}^{\,p} + \sum_{i=0}^{M-1} b_i \bullet R_{k-i}^{\,p} \bullet z_{k-i}^{\,p}$$

where $\theta_k^p$ is the derotation phase for the kth symbol during the pth iteration, $\theta_{k-i}^p$ represents the derotation phase for the (k-i)th symbol during the pth iteration, $a_i$ is a coefficient applied to $\theta_{k-i}^p$, $z_{k-i}^p$ is a residual derived from a comparison of a symbol $r_{k-i}^p$ with an estimate $s_{k-i}^p$ of that symbol, $R_{k-i}^p$ is the reliability metric for the estimate of the (k-i)th symbol during the pth iteration, $b_i$ is a coefficient applied to $R_{k-i}^p \bullet z_{k-i}^p$, and M and N are non-negative integers.

16. (original) The system of claim 1 wherein one or more residuals $z_k^p$ are phase residuals $e_k^p$.

17. (original) The system of any of claim 1 wherein one or more residuals $z_k^p$ are orthogonal component residuals $y_k^p$ representing the components of $r_k^p$ orthogonal to $s_k^p$.

18. (original) A receiver including the system of claim 1.

19. (original) A communications device including the receiver of claim 18.

20. (original) A set-top box comprising the communications device of claim 19.

21. (original) The system of claim 1 wherein the symbol derotator is a modulator.

22. (currently amended) An iterative carrier phase tracking decoding system comprising:

buffer means for buffering a block of symbols;

serial turbo decoding means for providing, during an iteration p, one or more estimates $s_k^p$ of one or more of the buffered symbols $r_k^p$, and~~, optionally,~~ having a capability to provide one or more reliability metrics $R_k^p$, for the one or more estimates, and, after a prescribed number of iterations, estimates of underlying source bits;

tracking loop means for, during an iteration p, (a) determining one or more residuals $z_k^p$ between one or more of the buffered symbols, $r_k^p$ and one or more corresponding symbol estimates, $s_k^p$; (b) ~~optionally~~ weighting the one or more residuals with one or more corresponding reliability metrics, $R_k^p$; and (c) determining one or more derotation phases $\theta_k^p$, responsive to one or more of the weighted or unweighted residuals;

symbol derotation means for derotating, during an iteration p, one or more of the buffered symbols, $r_k^p$, using one or more derotation phases, $\theta_k^p$, and storing one or more derotated symbols, $t_k^p$, back in the buffer; and

control means for directing the system to perform one or more iterations.

23. (currently amended) A method of performing iterative decoding, comprising the following steps:

providing one or more estimates $s_k^p$ of a block of buffered symbols $r_k^p$;

~~optionally~~ providing one or more reliability metrics $R_k^p$ for corresponding one or more estimates;

determining one or more residuals $z_k^p$ between one or more buffered symbols $r_k^p$ and one or more symbol estimates $s_k^p$;

~~optionally~~ weighting one or more residuals $z_k^p$ with one or more reliability metrics $R_k^p$;

determining one or more derotation phases $\theta_k^p$ responsive to one or more of the weighted or unweighted residuals;

derotating one or more buffered symbols $r_k^p$ using one or more derotation phases $\theta_k^p$; buffering one or more derotated symbols $t_k^p$;

if a prescribed number of iterations has not been completed, performing another iteration beginning with the first providing step; and

after a prescribed number of iterations has been completed, providing estimates of underlying source bits.

24. (original) The method of claim 23 further comprising derotating one or more buffered symbols $r_k^p$ only during selected iterations.

25. (original) The method of claim 23 further comprising derotating one or more buffered symbols $r_k^p$ after a prescribed number of iterations.

26. (original) The method of claim 23 further comprising derotating one or more buffered symbols $r_k^p$ only during an initial number of iterations.

27. (original) The method of claim 23 further comprising determining one or more derotation phases $\theta_i^p$ in accordance with the following equation:

$$\theta_i^{\,p} = \sum_{j=i-W/2}^{j=i+W/2} z_j^{\,p} \bullet w_j$$

where $\sum_{j=i-W/2}^{j=i+W/2} w_j = 1$, W is the size of a window, in terms of number of symbols; $z_j^p$ is a residual derived from a comparison of a buffered symbol $r_j^p$ with a corresponding estimate of that symbol $s_j^p$; and $w_j$ is the weight assigned to the jth residual $z_j^p$.

28. (original) The method of claim 27 wherein the weights $w_j$ follow a time-domain description of a predefined phase-noise mask.

29. (original) The method of claim 23 further comprising determining one or more derotation phases $\theta_i^p$ in accordance with the following expression:

$$\theta_i^{\,p} = \frac{\sum_{j=i-W/2}^{j=i+W/2} z_j^{\,p} \bullet w_j \bullet R_j^{\,p}}{\sum_{j=i-W/2}^{j=i+W/2} w_j \bullet R_j^{\,p}}$$

where W is the size of a window, in terms of number of symbols; $z_j^p$ is a residual derived from a comparison of a buffered symbol $r_j^p$ with a corresponding estimate of that symbol $s_j^p$; $w_j$ is the weight assigned to the jth residual $z_j^p$; and $R_j^p$ is a reliability metric for the symbol estimate $s_j^p$.

30. (original) The method of claim 23 further comprising determining one or more derotation phases $\theta_k^p$ in accordance with the following equation:

$$\theta_k^{\,p} = \sum_{i=1}^{N} a_i \bullet \theta_{k-i}^{\,p} + \sum_{i=0}^{M-1} b_i \bullet R_{k-i}^{\,p} \bullet z_{k-i}^{\,p}$$

where $\theta_k^p$ is the derotation phase for the kth symbol determined during the pth iteration, $\theta_{k-i}^p$ represents the derotation phase for the (k-i)th symbol during the pth iteration, $a_i$ is a coefficient applied to $\theta_{k-i}^p$, $z_{k-i}^p$ is a residual derived from a comparison of a symbol $r_{k-i}^p$ with an estimate $s_{k-i}^p$ of that symbol, $R_{k-i}^p$ is the reliability metric for the estimate of the (k-i)th symbol during the pth iteration, $b_i$ is a coefficient applied to $R_{k-i}^p \bullet z_{k-i}^p$, and M and N are non-negative integers.

31. (original) The method of claim 23 wherein one or more residuals $z_k^p$ are phase residuals $e_k^p$.

32. (original) The method of claim 23 wherein one or more residuals $z_k^p$ are orthogonal component residuals $y_k^p$ representing the components of one or more of the buffered symbols $r_k^p$ orthogonal to corresponding one or more estimates $s_k^p$.

33. (original) A computer readable medium tangibly embodying the steps of any of the methods of claims 23-32.

34. (original) The medium of claim 33 which is a memory.

35. (original) Circuitry embodying the steps of any of the methods of claims 23-32.

36. (original) The circuitry of claim 35 in a decoder.

37. (original) A synthesized logic circuit which comprises the circuitry of claim 36.

38. (original) An integrated circuit which comprises the circuitry of claim 36.

39. (currently amended) A method of performing iterative decoding, comprising the following steps:

a step of providing one or more estimates $s_k^p$ of one or more buffered symbols $r_k^p$;

a step of ~~optionally~~ providing one or more reliability metrics $R_k^p$ for one or more estimates;

a step of determining one or more residuals $z_k^p$ between one or more buffered symbols $r_k^p$ and corresponding one or more symbol estimates $s_k^p$;

a step of ~~optionally~~ weighting one or more residuals $z_k^p$ with one or more corresponding reliability metrics $R_k^p$;

a step of determining one or more derotation phases $\theta_k^p$ responsive to one or more of the weighted or unweighted residuals;

a step of derotating one or more buffered symbols $r_k^p$ using one or more derotation phases $\theta_k^p$;

a step of buffering one or more derotated symbols $t_k^p$;

if a prescribed number of iterations has not been completed, a step of performing another iteration beginning with the first providing step; and

after a prescribed number of iterations has been completed, a step of providing estimates of underlying source bits.